CORRESPONDENCE ANALYSIS OF RICE FARMER CHARACTERISTICS AND THE ADOPTION LEVEL OF WAREHOUSE RECEIPT SYSTEM INNOVATION

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ABSTRACT: *Characteristics of rice farmer had a correlation with the warehouse receipt system innovation-decision process. The objective of this research was to analyze the association between rice farmer characteristics and the adoption level of warehouse receipt system. The data of this research was collected from 90 rice farmers who adopted warehouse receipt system managed by PT Pertani Agribusiness Warehouse Unit Haurgeulis in Indramayu Regency during 2011 – 2014. The correspondence analysis was used to find the answer of research objective. The result of this research was needed to determine the rice farmer target in diffusion of innovation process in order to increase the adoption level of warehouse receipt system optimally. The result of this research showed that age, farm scale, and farm experience were the rice farmer's characteristics that had significant assosiation with the adoption level of warehouse receipt system in Indramayu Regency. This research suggested that to improve the adoption level of WRS, the diffusion of WRS process should engange the rice farmers who had the cultivated land 4 – 10 ha,, farm experience above 25 years, and age was above 50 years.*

Keywords: warehouse receipt system; rice farmer characteristics; correspondency analysis; diffusion of innovation

1. INTRODUCTION

Price fluctuation often happened in agriculture commodity including rice. It caused the rice farmers lossy particularly in harvesting period. Indonesian goverment had issued the policy, namely warehouse receipt system (WRS), to overcome this problem according to Indonesian law number 9/2006. Warehouse receipt system played role to elevate the farmer rice disadvantage consequence of price fluctuation [1, 2] .

The official launching of the implementation of the WRS in Indonesia was first conducted in 2008 through a WRS pilot project in four areas, namely: Banyumas (Central Java), Indramayu Regency (West Java), Jombang (East Java), and Gowa (South Sulawesi) [3]. Commodities that can be stored in the warehouse in order to include the implementation of WRS are nine commodities, namely: grain, rice, corn, coffee, cocoa, pepper, rubber, sea grass and wicker. This study chose rice commodities as commodities studied considering rice is one of the staple food sources which is very important for the people of Indonesia.

Bappepti [3] says that the government's role in controlling the fluctuation of the price of food commodity scheme of WRS will be effective if the food commodities that are stored in the WRS warehouse ranges from 8 to 10% of total production. Based on this, it can be claimed that the implementation of WRS in Indramayu has not yet run effectively given the amount of rice stored in warehouses of WRS does not meet these specifications. The amount of rice stored in warehouses of WRS managed by PT Pertani of Haurgeulis Unit in 2008 amounted to 0.014% and in 2012 amounted to 0.182% of the production. Increasing the role of rice farmers to utilize the warehouse WRS is an effort that can be carried out to encourage the successful implementation of WRS in Indramayu.

According to the model of five stages in the innovation-decision process [4], the characteristics of the decision unit has a correlation with the innovation-decision process especially in the knowledge stage. In this stage, an individual (or other decision-making unit) is exposed to innovation existence and gains an understanding of how it functions.

Research related to varied characteristics of each decision unit has been widely applied in various types of innovation [5, 6, 7, 8, 9, 10]. Results of the research that have been conducted show that the characteristics of the individual are important factors to determine a person's level of adoption of an innovation. Masud and Kari [11] research results regarding behavior related to the conservation of the environment show that the demographic factors (age, sex) and socio-economic (education, employment, income) have a significant effect on conservation behavior.

Information on the relationship between the characteristics of the rice farmers and the level of innovation adoption of WRS in Indramayu is needed to improve the effectiveness of the diffusion of WRS innovation in the future. The effectiveness of WRS innovation diffusion will conceptually happen if the process of diffusion of innovation committed against public WRS (rice farmers) is appropriate. In this regard, the purpose of this study was to analyze the relationship between the characteristics of the rice farmers and the level of WRS innovation adoption in Indramayu.

Characteristics of rice farmers are internal factors inherent in a rice farmer. Given the characteristics of many types of rice farmers, this study limits the characteristics of rice farmers who tend to adopt WRS innovation according to the characteristics, namely: age, sex, formal education, farm scale, farm experience, and residence area.

Results of this study are expected to be able to map the rice farmers that have characteristics in accordance with the implementation of WRS innovation that could ultimately be used to improve the process of WRS innovation adoption especially for rice farmers in Indramayu.

2. METHODS

The research design was the correlational research strategy and the descriptive research strategy [12]. This study was conducted in Indramayu, West Java Province. Indramayu Regency was chosen as a test site for several reasons, namely: 1) Indramayu is one of the first Regencies to implement WRS in Indonesia and 2) Indramayu Regency is a center of rice production in Indonesia.

The population of this research is all rice farmers who never store grain in the barn of WRS (adopting WRS innovation) in Haurgeulis Unit of Indramayu Regency during the period of 2011 - 2014, as many as 174 farmers. The total number of samples taken in this study was 90 out of 174 farmers (52%) which were randomly determined.

The data collected in this study consist of primary data and secondary data. Primary data collected are the data relating to the characteristics of rice farmers and the level of adoption of the WRS innovation. Measurement of primary data in this

study was conducted using data of both nominal and ordinal categories (Table 1). Primary data were collected through direct observation in the field, interviews and questionnaires. While, secondary data were collected through the retrieval database of relevant institutions.

Table 1 The operasionalization of research variables

Variables	Definition	Measurement Scale
Age	Number of years of age of the farmers at the time the research was conducted	1. Young (16 – 30 years) 2. Adult (31 – 50 years) 3. Old (≥ 50 years)
Sex	The sex of rice farmer that had adopted WRS	1. Male 2. Female
Formal Education	The formal education level that had been achieved by rice farmer	1. Low (Elementary School) 2. Medium (Junior and Senior High School) 3. High (University)
Farm Scale	The number of land (hectar/ha) that are cultivated by rice farmer	1. Low (1 – 3 ha) 2. Medium (4 – 6 ha) 3. High (7 – 10 ha)
Farm Experience	Number of farmers' working year	1. Low (≤ 10 years) 2. Medium (10 – 25 years) 3. High (> 25 years)
Residence Area	Rice farmers' regency	1. Indramayu regency 2. Subang regency
Adoption Level	The frequency of WRS adoption	1. Very low (score interval 1,00 – 1,75) 2. Low (score interval 1,76 – 2,50) 3. High (score interval 2,51 – 3,25) 4. Very high (score interval 3,26 – 4,00)

Table 1 shows that all the variables were measured using data category. The data were analyzed using correspondence analysis [13, 14]. Correspondence Analysis (CA) is an appropriate technique to explore the relationships among the response variable categories. The outcome of CA is a graphical display of the rows and columns of a contingency table that is designed to permit visualization of the salient relationships among the variable responses in a low-dimensional space. Such a representation reveals a more global picture of the relationships among row-column pairs, which would otherwise not be detected through a pairwise analysis [13]. CA is one or more sets of scale values for the rows and columns, values that have a geometric interpretation leading to visualizations of the similarities between rows and between columns, as well as the row-column associations [14]. Correspondence analysis used in this study has basically been widely used in various studies [15,16,17,18,19,20,21,22,23,24,25,26,27,28, 29] The use of CA in this research on the relationship between the characteristics of rice farmers and rice farmer adoption rate of WRS innovations has so far not yet been conducted. The use of CA in this study is expected to answer the research objectives and enrich the study of the use of CA, especially in agriculture.

3. RESULTS AND DISCUSSION

Results of the study (Figure 1) indicate that the adult age group (31-50 years) is a group of rice farmers adopting WRS innovations the most in Indramayu Regency during the period 2011-2014, which is about 74.44%. Number of rice farmers who adopt WRS innovations on the old and young age groups, respectively, are as much as 15.56% and10%. Distribution of WRS innovation adoption rate of rice farmers in the adult age group is low (42.22%), very low (17.78%), high (8.89%) and very high (5.56%). Distribution of WRS innovation adoption rate of rice farmers with the old group is low (6.67%), high (5.56%), very high (2.22%) and very low (1.11%). Meanwhile, the distribution of adoption rate of WRS innovations of rice farmers with a young age group is low (8.89%) and very low (1.11%).

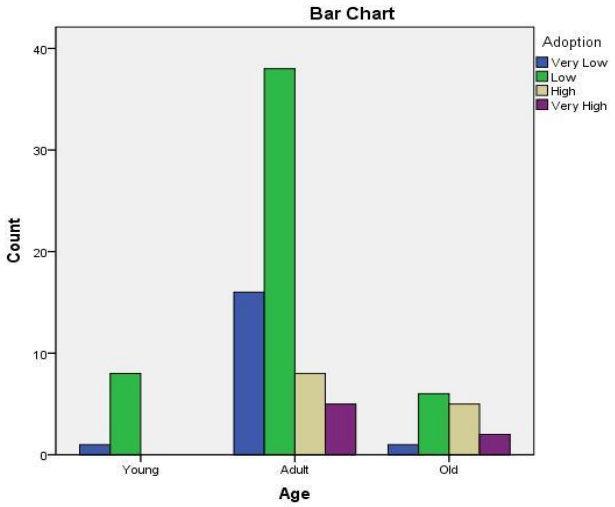

Figure 1 Number of rice farmers who adopted the WRS based on their age

Results of the study (Figure 2) showed that more male rice farmers adopted WRS innovation in Indramayu Regency during the period 2011-2014, which is about 57.78%. Number of female rice farmers who adopted WRS innovations is as much as 42.22%. WRS distribution rate of innovation adoption of male rice farmers is low (32.22%), very low (14.44%), high (6.67%) and very high (3.33%). Meanwhile, the distribution rate of adoption of WRS innovations of female rice farmers is low (25.56%), high (6.67%), very low (5.56%) and very high (4.44%).

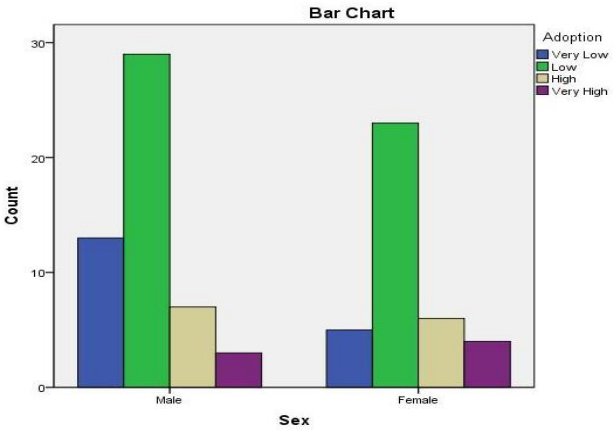

Figure 2 Number of rice farmer who adopted the WRS based on their sex

The results showed that the rice farmers of medium education (junior and senior high school) constituted the majority of rice farmers who have adopted WRS innovations in Indramayu Regency during the period 2011-2014, which was about 75.56%. Number of rice farmers in Indramayu of low and high-education is as much as 23.33% and 1.11% respectively. Distribution of WRS innovation adoption rate of rice farmers of medium-education is low (41.11%), very low (17.78%), high (11.11%) and very high (5.56%). Distribution of WRS innovation adoption rate of low-education rice farmers is low (15.56%), high (3.33%), very high (2.22%) and very low (2.22%). Meanwhile, the distribution of WRS innovation adoption of rice farmers of high- education occur at a low adoption rate, amounting to1.11% (Figure 3).

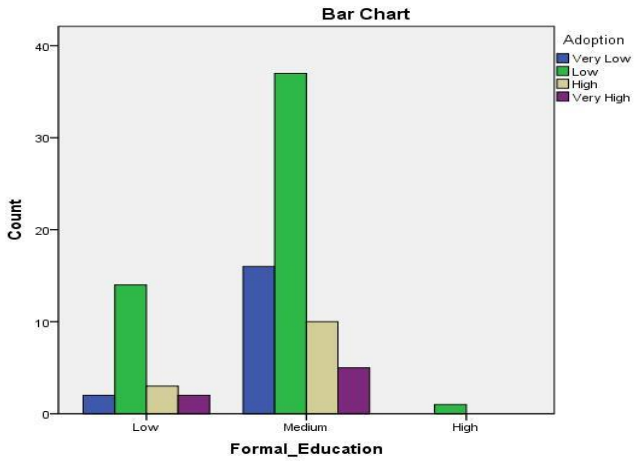

Figure 3 Number of rice farmer who adopted WRS based on their formal education

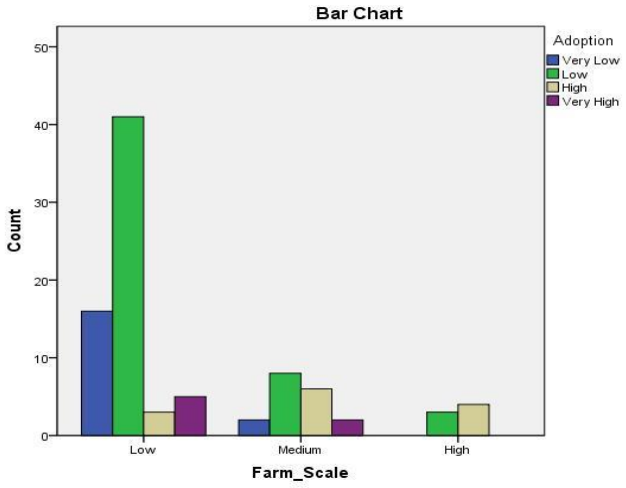

Figure 4 Number of rice farmer who adopted the WRS based on their farm scale

The results showed that the rice farmers who have business scale (farm scale) with lower category (1-3 ha) constituted the majority of rice farmers who adopt innovations in Indramayu Regency during the period 2011-2014, which is about 72.22%. Number of rice farmers who have a medium-scale and high-scale enterprises, respectively, are as much as 20% and 7.78%. Distribution of WRS innovation adoption rate of rice farmers who have business scale with low category is low (45.56%), very low (17.78%), very high (5.56%) and high (3.33%). Distribution of WRS innovation adoption rate of rice farmers who have business with the scale of medium category is low (8.89%), high (6.67%), very high (2.22%) and very low (2.22%). Meanwhile, the distribution of the group of rice farmers who have business scale with high category is 4.44% and low category is 3.33% (Figure 4

Figure 5 shows that the rice farmers who have experience of paddy farming (farm experience) with the category of medium (10-25 years) is a group of rice farmers that mostly adopt WRS innovations in Indramayu Regency during the period 2011-2014, i.e. as much as 53.33%. Number of rice farmers who have experience of farming with low category (<10 years) and high (> 25 years), respectively, is as much as 30.00% and 16.67%. Distribution of WRS innovation adoption rate of rice farmers who have experience of farming with medium category is low (33.33%), very low (12.22%), high (5.56%) and very high (2.22%).

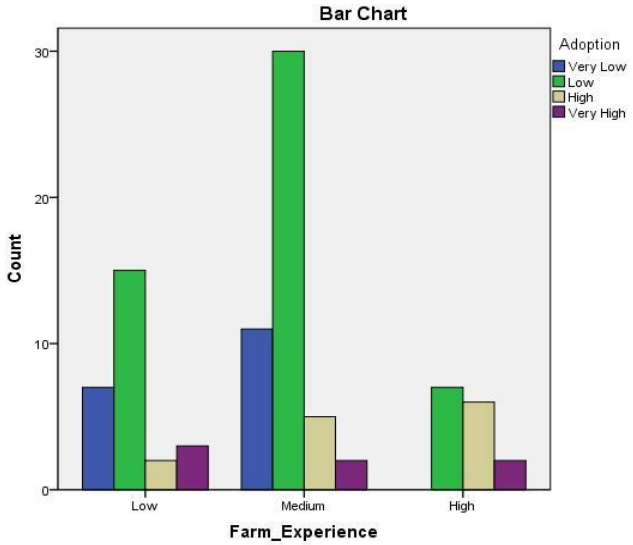

Figure 5 Number of rice farmer who adopted WRS based on their farm experience

Distribution of WRS innovation adoption rate of rice farmers who have experience of rice farming with low category is low (16.67%), very low (7.78%), very high (3.33%) and high (2.22%). Meanwhile, the distribution of WRS innovation adoption rate in a group of rice farmers who have experience of rice farming with high category is low (7.78%), high (6.67%) and very high (2.22%).

Figure 6 shows that the rice farmers who reside in Indramayu is a group of rice farmers who mostly adopt WRS innovations in Indramayu Regency during the period 2011-2014, which is about 75.56%. Number of rice farmers who adopt WRS innovations residing in Subang Regency is as much as 24.44%. WRS distribution rate of adoption of innovations that occur in rice farmer who resides in Indramayu is low (44.44%), very low (17.78%), high (10.00%) and very high (3.33%). Meanwhile, the distribution rate of adoption of WRS innovations of rice farmers who live in Subang Regency is low (13.33%), high (4.44%), very high (4.44%) and very low (2.22%).

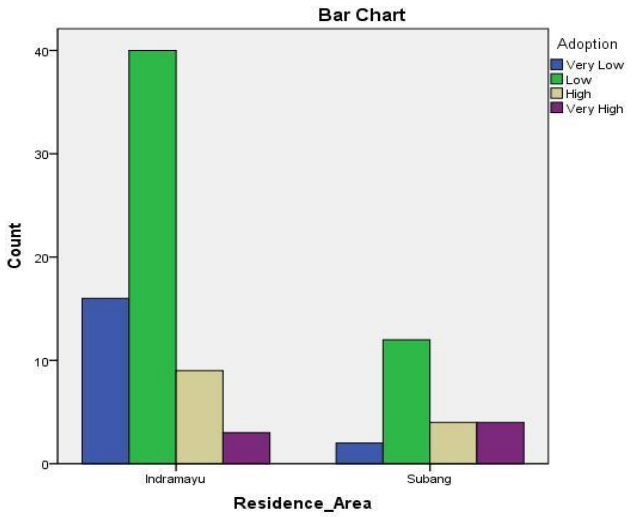

Figure 6 Number of rice farmer who adopted WRS based on their residence area

4. CHI-SQUARE TESTS

Utilization of frequency distribution chart (Figure 1-6) can generally describe some differences between the characteristics of rice farmer associations and the level of WRS innovation adoption in Indramayu. Nevertheless, the difference which conceptually occurs cannot be explained whether it is real or not. The frequency distribution chart in this case cannot be used to explain whether there is an association between the characteristics of the rice farmers and the level of WRS innovation adoption. Further analysis is needed to see whether or not the association exists.

Chi-square test is a conducted further analysis which is carried out to see whether there is an association between the characteristics of the rice farmers and the level of WRS innovation adoption in Indramayu. Conceptually, the chi-square test can be used to analyze whether there is an association between the characteristics of the rice farmers and the level of WRS innovation adoption at the desired level of confidence.

The result of the chi-square test showed that not all characteristics of rice farmers studied (age, sex, formal education, farm scale, farm experience, and residence area) have a significant association with the level of WRS innovation adoption. Characteristics of rice farmers who had significant associations with the level of WRS innovation adoption in Indramayu is farm scale (p-value <0.01) , farm experience (p-value <0.05), and age (p-value <0.10). Other rice farmer characteristics (sex, formal education, and residence area) do not have a significant association with the level of innovation adoption in the WRS warehouse managed by PT Pertani Warehousing Agribusiness Unit of Indramayu Regency (Table 2).

Table 2 Chi-square test between rice farmer characteristics and the adoption level of WRS in Indramayu Regency

Rice Farmer Characteristics	Chi-Squres Value	P-value
Age	11.524*	0.073
Sex	2.347	0.504
Formal Education	2.829	0.830
Farm Scale	22.374***	0.001
Farm Experince	14.240**	0.027
Residence Area	6.119	0.106

***It is significant at the 0.01 level
** It is significant at the 0.05 level
* It is significant at the 0.10 level

Table 2 shows that the farm scale is the characteristic of rice farmers who have the most obvious association with the level of WRS innovation adoption with an association of 22.374 (p-value <0.010). Results of this study indicate that the farm scale of rice farmers is a characteristic that is essential for increasing the effectiveness of WRS innovation diffusion process in Indramayu. The farm scale is indicated to be one of the characteristics of rice farmers which is very important. WRS warehouse manager in Indramayu (PT Pertani Warehousing Agribusiness Unit of Haurgeulis) requires that the amount of grain that can be stored by rice farmers in the WRS warehouse ranged between 10 - 20 tons. These requirements result that rice farmers can store grain in the WRS barn must have at least 10 tons of rice. If the assumed productivity of paddy in Indramayu Regency is 5 tons per hectare, farmer who can store rice grain in WRS warehouses managed by PT Pertani is a rice farmer who has vast arable land area of 2-4 ha.

Farm experience is a characteristic of rice farmers who have a real association with the level of WRS innovation adoption with a value of 14.240 (p-value <0.05). WRS is an innovation that is intended to overcome the fluctuation in agricultural commodity prices that often occurs at harvest time. Farmers who have high farm experience will tend to adopt WRS innovations. The higher the rice farm experience , the more rice farmers will be able to decide post-harvest handling which is better for the paddy harvest. WRS innovation in this case is one alternative that can be used by rice farmers to overcome the problems of post-harvest rice.

Table 2 shows that the age of rice farmers has a really positive association with the level of WRS innovation adoption with an association of 11.524 (p-value <0.10). This indicates that the higher the age of rice farmers, the higher chances for the rice farmers to adopt the WRS innovation. The long life of rice farmers is expected to contribute to the paddy farm experience , especially related to post- paddy harvest handling.

One of the requirements established by PT Pertani is in order for rice farmers to store grain in the WRS barn and the amount stored in WRS warehouses should range from 10-20 tons. This requirement caused not all farmers can afford to store grain harvest in the WRS barn. Only rice farmers who have rice as many as 10-20 tons or more who can store their grain in the WRS barn. The condition is estimated to lead to rice farmer characteristics associated with sex, formal education and residence area that do not have a significant association with the level of the rice farmers' adoption of WRS innovations.

The results of studies show that gender of rice farmers does not have a significant association with the level of the rice farmers' adoption of WRS innovation. It implies that the process of diffusion of WRS innovation in the future does not have to classify rice farmers by sex. Rice farmers either men or women have the same opportunities to adopt WRS innovations.

Formal education achieved by rice farmers in this study does not have a significant association with the level of WRS innovation adoption. These results indicate that WRS innovation is not intended for rice farmers with a certain level of formal education, but it can be utilized by all rice farmers at various levels of education. Thus, the process of diffusion of WRS innovation in the future does not need to relate to the education level of rice farmers.

The study findings related to the association between residence area of rice farmers and the level of WRS

innovation adoption in Indramayu indicates that the residence area is not significantly associated with the level of WRS innovation adoption. These findings indicate that the process of diffusion of WRS innovation for paddy in Indramayu does not have to classify rice farmers by residence area.

5. CORRESPONDENCE ANALYSIS

The result of the chi-square test (Table 2) showed that there are three characteristics of rice farmers who had significant associations with the level of WRS innovation adoption, i.e. farm scale (p-value <0.01), farm experience (p-value <0,05) and age (p-value <0.10). Although the chi-square test was able to show the characteristics of rice farmers who have a real association with the level of WRS innovation adoption, but it cannot indicate the closeness of the association.

Correspondence analysis (CA) is one test that can be used to analyze the association closeness that occurs between the characteristics of rice farmers with a level of WRS innovation adoption. CA utilization in this study was used to analyze the association between three characteristics of rice farmers (farm scale, farm experience, and age) with the level of WRS innovation adoption.

6. ASSOCIATION BETWEEN THE FARM SCALE OF RICE FARMER AND WRS ADOPTION LEVEL

The inertia value between the farm scale and WRS innovation adoption level shows that dimension one and two accounted for 96.3 and 3.7% respectively. The inertia proportion of the total of the two-dimensional cumulative values is 100% (Table 3). It indicates that there are real significant association between farm scale and WRS innovation adoption level.

Table 3 Inertia Value between the farm scale of rice farmer and WRS adoption level

Dimension	Inertia Value	
	Accounted for	Cumulative
1	0.963	0.963
2	0.037	1.000
Total	1.000	1.000

The inertia value between farm scale and WRS innovation adoption level (Table 3) shows that the correspondence analysis plot generated from the association could explain all the data. Correspondence analysis between the farm scale plot of rice farmer and WRS innovation adoption level is depicted in Figure7.

Figure 7 shows that there are three clusters that describe the closeness of the association between the rice farm scale and WRS innovation adoption level. First, the rice farmers with farm scale of low category have closeness with the innovation adoption level of low and very low category. Second, rice farmers with farm scale of medium category have closeness with WRS innovation adoption level with high and very high category. Third, the rice farmers with farm scale of high category have closeness with WRS innovation adoption level with high category.

he correspondence analysis of farm scale and WRS innovation adoption level shows that the characteristics of the rice farmers who need to be involved in the process is those who have a farm scale of medium category (arable land area of 4-6 ha) and high category (arable land area of 7-10 ha). This is due to the characteristics of the rice farmers who have rice of sufficient quantity to be stored in WRS warehouses.

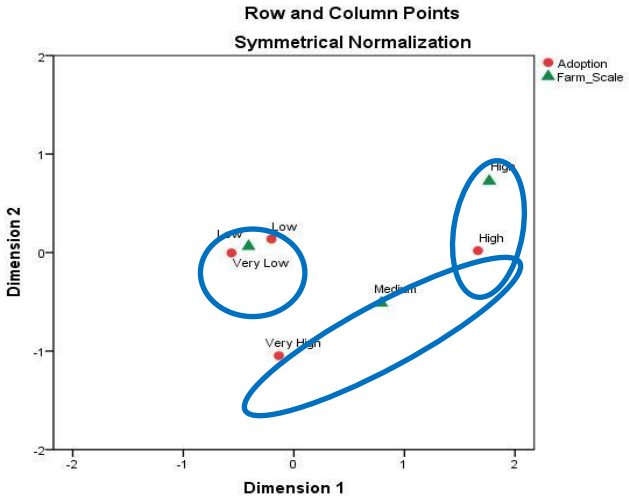

Figure 7 Correspondence analysis plot between the farm scale of rice farmer and the WRS adoption level in Indramayu Regency

7. ASSOCIATION BETWEEN THE FARM EXPERIENCE OF RICE FARMER AND WRS ADOPTION LEVEL

The inertia value between farm experience and WRS innovation adoption level shows that dimension one and dimension two accounted for 90.2% and 9.8% respectively. The inertia value of the total of the two-dimensional cumulative values is 100% (Table 4). This calculation indicates that there is a really significant association between farm experience and WRS innovation adoption level.

Table 4 Inertia value between farm experience of rice farmer and WRS adoption level

Dimension	Inertia Value	
	Accounted for	Cumulative
1	0.902	0.902
2	0.098	1.000
Total	1.000	1.000

The inertia value between farm experience and WRS innovation adoption level (Table 4) shows that the correspondence analysis plot generated from the association could explain all the data. Correspondence plot analysis farm experience of rice farmer and WRS adoption level is depicted in Figure8.

Figure 8 shows that there are three clusters that describe the closeness of the association between farm experience and WRS innovation adoption level. First, the rice farmers with farm experience of low category have closeness with the innovation adoption level of very low category. Second, the rice farmers with farm experience of medium category have closeness with WRS innovation adoption level of with low category. Third, the rice farmers with farm experience of high category have closeness with WRS innovation adoption level of high category.

The correspondence analysis between the farm experience and WRS innovation adoption level (Figure 8) indicates that the characteristics of the rice farmers who need to be involved in the process is those who have the farm experience of high category (> 25 years). This is due to the farm experience of the farmers in dealing with post-harvest in a long period. Various post-harvest experiences

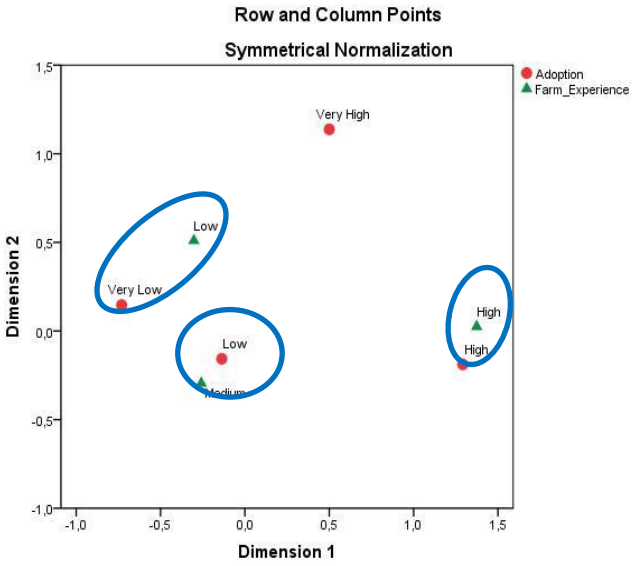

Figure 8 Correspondence analysis plot between the farm experience of rice farmer and WRS adoption level in Indramayu Regency

particularly with respect to fluctuation of rice price, made rice farmers have good sensitivity in decision making related to the handling of the rice harvest. The decision to adopt WRS innovation is possible for the rice farmers when prices tend to decline in the harvest period.

8. ASSOCIATION BETWEEN THE AGE OF RICE FARMER AND WRS ADOPTION LEVEL

The inertia value between the age of rice farmers and the WRS innovation adoption level shows that the dimension one and two accounted for 81.3% and 18.7% respectively. The inertia value of the total of the two-dimensional cumulative values is 100% (Table 5). This indicates that there is really significant association between the age of rice farmers and WRS innovation adoption level.

Table 5 Inertia value between the age of rice farmer and WRS adoption level

Dimension	Inertia Value	
	Accounted for	Cumulative
1	0.813	0.813
2	0.187	1.000
Total	1.000	1.000

The inertia value between the age of farmers and WRS innovation adoption level (Table 4) shows that the correspondence analysis plot generated from the association could explain all the data. Correspondence analysis plot between the age of the rice farmers and WRS adoption level is depicted in Figure 9.

Figure 9 shows that there are two clusters that describe the closeness of the association between the age of rice farmers and WRS innovation adoption level. First, the rice farmers whose age is of old category have closeness with the adoption rate of innovation with a high category. Second, the rice farmers whose age is of adult category have closeness with the level of WRS innovation adoption with low and very low categories.

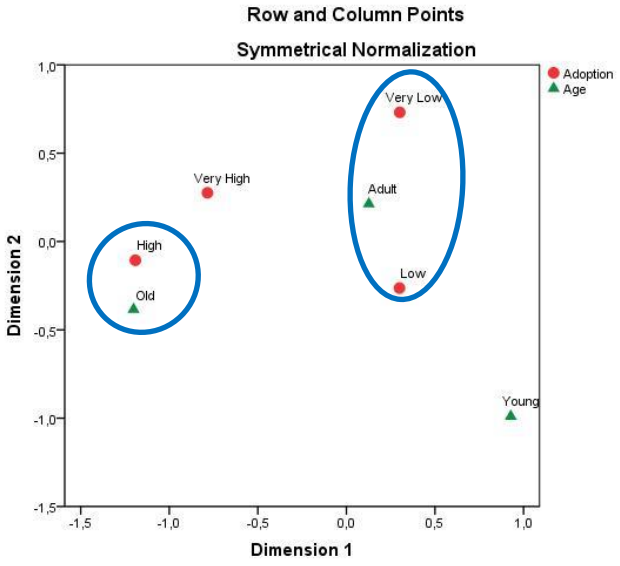

Figure 9 Correspondence analysis plot between the age of rice farmer and WRS adoption level in Indramayu Regency

The correspondence analysis between the age of rice farmers and WRS innovation adoption level (Figure 9) shows the characteristics of the rice farmers who need to be involved in the process is that who are at old category (≥ 50 years). Rice farmers with this characteristics tend to adopt WRS innovation with high category. This is because farmers with old category have adequate farm experience, stable rice farm, and stable economic conditions. Various tendencies of rice farmers over the age of 50 will make them able to take the right decisions in order to overcome the problem of post-harvest rice particularly in case of price fluctuations, particularly when rice price declines. The decision to utilize WRS as an alternative to overcome the decline in rice prices is a decision to be made by rice farmers in order not to suffer losses due to the rice price decline.

9. DISCUSSION

The study by Straub [30] regarding the adoption of a person to technological innovation shows that technology adoption is a complicated thing (complex) and inseparable from social and mental processes. Someone has a unique perception towards innovation. The success of the adoption process a person to innovation in this case cannot be separated from one's attitude toward the innovation itself. Stacks and Hocking [31] says that attitude is a tendency for people to respond to an object whether it is good or not. These trends mean that the attitude presents in a person's mind and cannot be directly observed. Attitude measurement is done by constructing the attitude variables by combining a variety of things that consists of stimuli, messages, responses, election, willingness, and so on. The message does not have a direct influence on behavior, but first affects the internal condition of a person's attitude or other new on behavior. Gilovich et al. [32] says that the success of the various ways to change a person's attitude depends on whom you want to change the behavior.

WRS innovation diffusion process with rice in Indramayu putting rice farmers as important audience to the success of the innovation diffusion process. Changing attitudes and behavior of rice farmers from the status quo towards innovation in this respect is a very important thing. Based on the study of factors affecting changes in attitudes and behavior of a person [30, 31, 32], the characteristics of rice farmers in Indramayu is an important factor to be considered to improve the process of diffusion of WRS innovation.

Based on the results of the chi-square test, from the six characteristics of the rice farmers (age, sex, formal education, farm scale, farm experience, residence area) there are only three characteristics that are closely associated with WRS innovation adoption. The three characteristics of rice farmers who have a real association is the farm scale (p-value <0.010), farm experience (p-value <0.050), and age (p-value <0.10). Results of this study indicate that farm scale, farm experience, and age of the rice farmer are important characteristics to consider in the process of diffusion of WRS innovations in Indramayu in the future.

WRS innovation adoption levels in this study were classified into 4 categories, namely: very low, low, high, and very high. WRS innovation levels with high and very high categories were assumed as the success of the process of diffusion of WRS innovation. The results of chi-square test was unable to answer the characteristics of rice farmers in more detail (farm scale, farm experience, and age) like what need to be considered that WRS innovation adoption level in the future may be at a high and very high levels.

Based on the results of correspondence analysis it is known that if in the future the WRS innovation adoption levels in Indramayu is targeted to be at a high and very high levels, then the process of diffusion of WRS innovation must involve rice farmers with the following characteristics: having farm scale in medium and high categories (arable land area of 4-10 ha), having farm experience with high category (> 25 years), and having age of old category (≥ 50 years).

The study findings related to the essential characteristics of rice farmers in Indramayu are predicted to increase the WRS innovation adoption levels. This can happen effectively if there is no change in the regulations particularly with regard to limits on the amount of rice that can be stored in the WRS warehouse managed by PT Pertani in Indramayu, The limits on the amount of rice that can be stored in the WRS warehouse managed by PT Pertani in Indramayu are effective to range from 10-20 tons.

Changes in policies and regulations related to WRS in the future are something very possible. In the event of regulatory changes related to the amount of rice that can be stored in the WRS warehouse by rice farmers, the results of this study need to be reexamined. The re-assessment needs to be done in order to obtain the characteristics of rice farmers in accordance with the regulatory changes of WRS.

10. CONCLUSION

Characteristics of rice farmers in Indramayu which have a real WRS innovation adoption levels with the farm scale (p-value < 0.010), farm experience (p-value < 0.050), and age (p-value < 0.10).

WRS innovation adoption level for rice farmers in Indramayu with high and very high categories in the future can be achieved when the process of diffusion of WRS innovation conducted involving rice farmers who have land area of rice farming of 4-10 ha, rice farm experience of >25years, and aged ≥50 years.

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